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ABSTRACT

To study the in class learning experiences of mainstreamed handicapped students, academic learning time (ALT) was measured for 79 mainstreamed learning disabled (LD) and 143 regular fifth and sixth graders in year 1 and 62 mainstreamed LD students and 166 regular students in year 2. Analyses of student records, responses to teacher questionnaires, and classroom observation revealed significant differences between LD and regular Ss in all five year 1 ALT variables: allocated time, engaged time, time on high success tasks, time on medium success tasks, and time on low success tasks. When ALT is defined as percent of time on high success tasks, mainstreamed students had less than half the ALT of their regular counterparts. Factors associated with ALT included sex (girls tended to have more engaged time and high success time, and less medium success time than boys) and age (younger mainstreamed girls had more ALT than older students in general). The relationships of teacher background variables to ALT variables was negligible. The teacher's instructional behavior was strongly correlated with student engagement. Overall, ALT measures were relatively unstable from 1 week's observation to the next, and from one study year's average to the next. (CL)

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Final Report
Grant No. G007902007

A Study of Academic Learning Time of Mainstreamed Learning Disabled Students

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I. RATIONALE AND OBJECTIVES OF THE STUDY

Background of the Study

The Education of All Handicapped Children Act, PL 94-142, is considered to be one of the most significant statements of federal educational legislation since the Elementary and Secondary Act (ESEA) of 1965 (Brodinsky, 1979).

The passage of PL 94-142 in 1975 marked the end of what Abeson and Zettel (1977) called a "quiet revolution," which advocated the rights of handicapped children to a free and appropriate education. Under PL 94-142, schools are in violation of federal law if handicapped students are denied their right to a free and appropriate public education. Furthermore, financial sanctions in the form of withdrawal of federal assistance to state, intermediate, and local educational agencies can be applied to schools found in non-compliance.

Full implementation of PL 94-142, which began in September 1978, has broad implications for fiscal arrangements (Ballard & Zettel, 1978a); management functions (Ballard & Zettel, 1978b); due process (Ballard & Zettel, 1977; Goodman, 1976, Harvey, 1978); and instructional planning and programming of special, as well as regular, education programs (Abeson & Zettel, 1977). Key ingredients of PL 94-142 include: mandates for the provision of a free and appropriate education for all handicapped children in the least restrictive environment, use of nondiscriminatory testing and evaluation procedures, development and implementation of individualized education programs, and adherence to procedural due process.

Although the term "mainstreaming" was never used in the law, the

context within which education of handicapped students should take place is specified in the principle of the least restrictive environment (LRE). This principle represents for the handicapped child "the right to be educated in the regular class, however defined, unless clear evidence is available that partial or complete removal is necessary" (Johnson, 1975, p. 157). In short, the burden of proof is on schools to show just cause to remove handicapped students from regular classes, and place them in more restrictive environments, such as self-contained special classes. Thus, despite some impediments and serious misinterpretations of the concept of mainstreaming (MacMillan, Jones & Meyer, 1976), "the question clearly is no longer whether to mainstream but rather how most effectively to mainstream." (MacMillian and Semmel, 1976).

Many of the current studies on the implementation of PL 94-142 (e.g., Blaschke, 1979; Management Analysis Center, 1977; Roy Littlejohn Associates, 1978; Stearns et. al. 1980; Marver and David, 1978; Safer, et al. n.d.) deal with organizational variables, administrative procedures, and the changing roles of special and regular teachers as handicapped students are now being educated in a variety of educational environments, including the regular class environment. In its report to the Congress on the implementation of PL 94-142, the Bureau of Education for the Handicapped (BEH) noted that "the predominant placement for handicapped pupils during the 1976-1977 school year was the regular classroom with auxilliary services." (U.S. DHEW, 1979, p.2). However, few studies are examining classroom level implementation of PL 94-142. There remain, therefore, significant unanswered questions. For example, what are the experiences of mainstreamed students in the regular classroom? Are they socially and academically integrated? To what extent is their presence affecting the teacher and other students?

What are the factors contributing to the successful integration of handicapped students? Currently, little is known that addresses or answers these questions. More in-class research is needed to explicate the dynamics of mainstreamed classes before the full story on implementation of PL 94-142 can be told. This study is designed to characterize aspects of in-class learning experiences of mainstreamed students in an effort to contribute to a fuller description and understanding of these experiences.

The research heuristic employed by this study to examine in-class learning experiences of mainstreamed students is the concept of time-on-task. Current classroom research has offered substantial evidence to indicate that time engaged in learning is a useful mediating variable to measure student in-class learning. It has been shown to correlate significantly with student achievement in academic areas (Denham and Lieberman, 1980). Furthermore, time is an immediate and manipulatable variable. That is, it is easily observable and, within limits, it is under the control of the teacher. The implication for classroom instruction is that teachers can use engaged time as the basis for observing, analyzing, and improving teaching.

The following section describes briefly the concept of time-on-task and discusses findings from relevant research studies.

Conceptual Basis of the Study

Conceptual Models Relating Time to School Learning

The concept of time-on-task has proved to be a useful heuristic to examine classroom learning in recent years. The concept was first postulated by Carroll (1963). Carroll described a model of school learning which was based on time engaged in learning a task and time needed for

learning that task. Engaged time in Carroll's model is a function of opportunity to learn and preseverance. Time needed for learning is a function of aptitude, ability to understand instruction, and the quality of instruction. Thus, the degree of learning for a specific task can be expressed as:

$$\text{Degree of Learning} = \frac{\text{Time Actually Spent}}{\text{Time Needed}}$$

The basic tenor of Carroll's model is that "the degree of learning, other things being equal, is a simple function of the amount of time during which the pupil engages actively in learning" (Carroll, 1963, p. 732).

Bloom's school learning model (1974, 1976) capitalizes on Carroll's concept of engagement and offers a more comprehensive model. Three sets of factors, in Bloom's view, influence achievement: (1) cognitive entry behavior; that is, the extent to which the student has already learned prerequisite skills, (2) affective entry characteristics; that is, the student's level of motivation and interest in learning the task, and (3) quality of instruction; that is, the process of teacher instruction, feedback, student participation and corrective procedures.

Bloom emphasizes the importance of student participation which is essentially synonomous to Carroll's engaged learning. In a summary of 20 studies, Bloom (1974) estimated that 20% of student variances in achievement is accounted for by his active participation in the learning process.

Wiley and Harnischfeger's (1974, 1976) model of teaching and learning is a direct extension of Carroll's model. In the Wiley and Harnischfeger model, time variables, i.e., allocated exposure time, usable exposure time, active learning time, and time needed for learning, are mediating variables between the set of input variables, i.e., student variables, teacher

variables and instructional quality, and the output variable, i.e., student learning. According to Wiley and Harnischfeger, there are enormous variations on input variables, such as curriculum, teacher characteristics, pupil characteristics, instructional quality, etc. These variables affect time variables. Variations in total active learning time and total needed learning time in turn determine achievement on specific learning tasks. In short, input variables to learning are mediated through the basic time variables of time needed to learn and time spent on learning tasks.

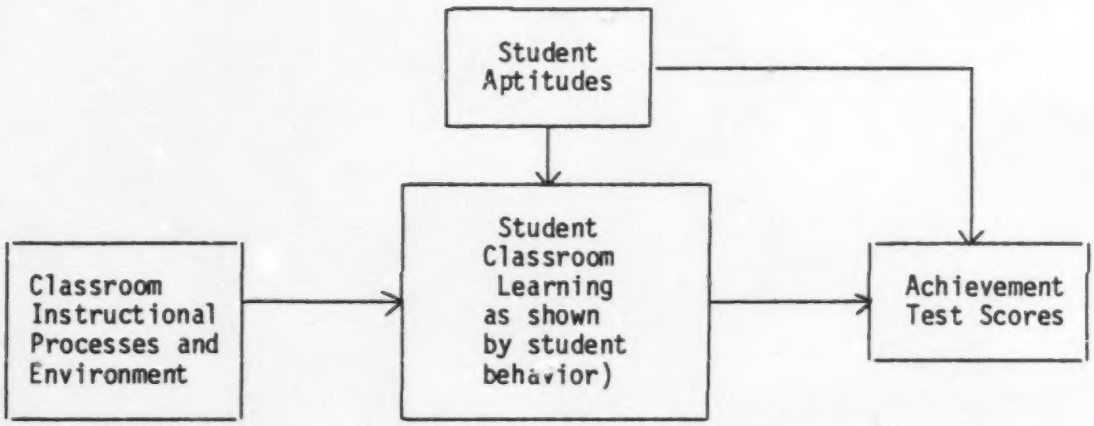
The Academic Learning Time Model

The conceptual basis for this study is the Academic Learning Time model (Fisher et. al. 1980), which builds upon the works of Carroll, Bloom, and Wiley & Harmischfeger.

The model (see Figure 1) states that "for a given student, certain instructional processes lead to classroom learning, which is then reflected in achievement test scores." (Fisher et. al. 1978) This relationship is also influenced by student aptitudes. The model distinguishes two measures of learning: student classroom learning and student achievement test scores. The model proposes that while achievement test scores are an indicator of learning, a more direct measure for student learning can be developed by examining student behavior in the classroom. This measure is known as the Academic Learning Time (ALT).

FIGURE 1

ALT Model


Student Aptitudes
Classroom Instructional Processes and Environment
Student Classroom Learning as shown by student behavior)
Achievement Test Scores

ALT is defined as "the amount of time a student spends engaged in an academic task that s/he can perform with high success." Thus, "the more ALT a student accumulates, the more the student is learning." (Fisher et. al. 1980)

Operationally, ALT consists of three components: allocated time, engaged time, and time on levels of success tasks. Allocated time is the maximum time or opportunity for a student to learn a given task. For some of the allocated time, a student will be actively engaged on a task; for other time, s/he will be off task or unengaged. Since a student can only learn when s/he is paying attention, a measure of learning should include only time when the student is engaged. Hence, engaged time represents that part of allocated time during which the student is engaged. As students are engaged on tasks, they are likely to experience degrees of success that reflect the appropriateness of the tasks the students are working on. Three broad levels of success on a task are identified. Situations where the student has a good grasp on the task and only makes occasional careless errors are called high-success. If a student does not understand the task and

makes correct responses at about the chance level, this situation is labeled low-success. Situations that fall between high- and low-success are defined as medium-success. Medium-success involves situations of partial understanding, where the student understands enough to produce some correct responses, but also commits errors due to limitations in his/her understanding.

Research Relating Time to School Learning

Research evidence which indicates that direct instruction in specific academic areas and amount of time students spend in academic learning are positively related to student achievement in specific areas has been rapidly accumulating. (Rosenshine, 1978)

With respect to allocated time, or time provided for learning, Wiley and Harnischfeger (1974) examined the average number of hours of schooling students received and found that variation by school was dramatically associated with acquisition of verbal and mathematical knowledge. Studies conducted by Bond and Dykstra (1967), Harris and Serwer (1966), and Harris, Morrison, Serwer, and Gold (1963) all reported negative correlations between teacher or student absences and achievement. In an extensive evaluation of 150 Follow Through classrooms, Stallings (1975) obtained similar results. Three hundred-forty correlations between reading achievement and classroom processes were computed; 118 of these were significant at the .05 level. Of these, the most strongly correlated variables suggested that the length of the school day and the average time a child spent engaged in a reading activity were related to high reading scores in both the first and third grades.

In his review of research on the relationship between engagement (time-on-task) and student achievement, Bloom (1976) found that the correlations between achievement and on-task behavior ranged from .37 to .58 with a

median of .48 when the class was the unit of analysis. In the Stallings and Kaskowitz (1974) study of Follow Through classes, correlations of engagement in reading and math with achievement ranged from .3 to .6. Good and Beckerman (1978) in a study of sixth grade students found that on-task behavior was slightly higher for high achievers and for female students. Furthermore, on-task behavior varied according to subject matter. Borg concluded in his review, "when we find 16 studies that differ in virtually every aspect of design and yet yield consistent positive results, we can be very confident that the relationships (between time-on-task and achievement) found are real and enduring. Although some correlations between achievement measures and on-task time are as high as .87, the majority are in the range from .30 to .50, thus accounting for 9 to 25 percent of the achievement variance" (Borg, 1980, p. 63)

Studies by Fisher, et. al. over a four-year period with second and fifth grade students in reading and mathematics found support for the general premise that accumulation of ALT lead to gains in achievement (Fisher et. al. 1978; Fisher et. al. 1976; Filby and Dishaw, 1978; Marliave, 1977). Supportive findings which appear in more than 60 technical reports are summarized in Teaching and Learning in the Elementary School: A Summary of the Beginning Teacher Evaluation Study (Fisher et. al. 1978). Findings with respect to relationships between ALT and student achievement are:

- The amount of time that teachers allocate to instruction in a particular curriculum content area is positively associated with achievement in that content area.
- The proportion of allocated time that students are engaged is positively associated with achievement.
- The proportion of time that reading or mathematics tasks provide a high success rate for a student is positively associated with student achievement.

- Increases in Academic Learning Time are not associated with decreases in attitude towards mathematics, attitude toward reading, or attitude toward school.

Study Objectives

The need for better understanding of in-class experiences of mainstreamed students, coupled with the conceptual advances and findings relating time to classroom learning constitute the foundation of this study. The study is intended as a descriptive study focusing on in-class learning experiences of mainstreamed students in contrast with experiences of regular students in the same classes. Measures of ALT constitute the investigative tools for gauging student experiences.

As a descriptive study, it does not attempt to use measures of ALT to assess or evaluate the efficiency of mainstreaming at the classroom level. Much more needs to be known about the correlations of ALT student, with teacher, and classroom variables operating in mainstreamed classes.

The study will describe ALT of mainstreamed and regular students, examine stability of ALT measures, and explore factors related to ALT for mainstreamed and regular students. Specifically, the objective of the study is to answer the following questions:

1. What are the Academic Learning Time (ALT) differences between mainstreamed learning disabled (LD) and regular students?
2. How stable are measures of Academic Learning Time (ALT) for mainstreamed Learning disabled (LD) and regular students?
3. What are the student, teacher, and classroom variables which are related to Academic Learning Time (ALT) for mainstreamed learning disabled (LD) and regular students?

II. STUDY PROCEDURE

Study Design

The basic design for this study parallels that of the ALT study (Fisher et. al. 1978). The design called for repeated classroom observations of a sample of mainstreamed and regular students over a two year period.

A decision was made to select an academic subject area for classroom observations. This decision was based on the premise that academic subject areas are likely to be the most demanding subject areas in which mainstreamed students are required to perform. Math was selected as the academic subject matter. Math classes, unlike reading classes, provide more intact groups of mainstreamed and regular students. That is, mainsreamed students are less likely to be pulled out of math classes and given remedial instruction by a Resource or Special Education teacher than other academic subjects such as reading.

Fifth and sixth grade classes were selected for classroom observations. This was done to offer somewhat comparable data to the earlier ALT studies, (Fisher et. al. 1978) some of which were done at the 5th grade class level.

With respect to types of exceptionality, the decision was made to confine exceptionality to one type rather than to study mainstreamed students with a variety of handicapping conditions. While the exclusion of students with other handicapping conditions delimited the generalizability of findings to handicapped students in general, it was felt that it would strengthen the internal validity of the study. Learning disabled students (LD)

were selected as the study sample for two reasons: other than students with speech impairments, they represent the most prevalent group of students being served in regular classes (U.S. DHEW, 1979) and, by definition, they represent a wider band of learning difficulties than students otherwise labelled e.g., educable mentally retarded (EMR).

Classroom observations constituted the primary data collection method. Since single observations of students and teacher behavior would not provide valid indexes of ALT, a total of ten observations (five per year) were completed. Furthermore, since the amount of classroom data needed for each student was quite extensive, it was impossible for a classroom observer to observe and record information on every student in the class. Thus, a sample of six students per class made up of mainstreamed LD and regular students, was selected for observation.

Attempts were made to track as many of the students in the Year 1 sample as possible as they were promoted the following year (Year 2) to the next grade. This was done to provide an added dimension to the study in that it would be possible to examine the stability or change of ALT across two academic years.

In short, the study design followed closely the methodology used by ALT researchers with two noted exceptions. First, students being observed consisted of both mainstreamed LD and regular students. Second, many of the same students observed in Year 1 were observed again in Year 2 to offer longitudinal data on ALT.

Sample Selection

Recruitment of the sample began with the identification of districts within a 50-mile radius of San Francisco that had at least two years'

experience in mainstreaming. Proximity to San Francisco was necessary so as to allow project staff to maintain close contact with participating schools. Experience with mainstreaming was felt to be important in that inexperienced sites undoubtedly face start-up difficulties. Selecting only experienced sites eliminated the possibility that outcomes of the study could be attributed to these difficulties.

The next step in the recruitment process was to obtain consent from superintendents and coordinators/directors of special education in the districts identified. Following district-level consent, meetings were scheduled with interested elementary principals to further explain the intent and time requirements of the study. Each principal, in turn, presented the study to his/her 5th-grade teachers. In some cases, project staff were requested to be present to explain the study to potential teacher participants. Teachers who expressed interest in participating in the study and who had at least one mainstreamed learning disabled (LD) student in their 5th-grade classes were then contacted, and a schedule of classroom observations was developed.

A total of six students were selected from each class. For the Year 1 sample, the following student selection procedure was followed. Project staff examined student files by class and accepted all 5th-grade students who were designated learning disabled (LD), and who were receiving math instruction from the regular teacher. The number of LD students accepted per class ranged from one to four. The remaining two to five students were selected from teacher nominations. Teachers were told to nominate regular students who were performing at grade level in math. Using this procedure, the Year 1 sample consisted of 79 mainstreamed LD students and 141 regular 5th-grade students in 37 classes.

For the second year sample, attempts were made to follow up as many of the LD and regular students from Year 1 as possible as they were promoted to 6th grade. In addition to obtaining the district and building principal's consent, the procedure for selecting the Year 2 student sample was as follows. We assumed that most of the 5th-grade students in the Year 1 sample would remain in the same building and district as they were promoted to 6th-grade. Working on that assumption, we took the list of Year 1 students by building and checked it against all 6th-grade class lists in the same building. Of the original 222 students in the Year 1 sample, we were able to locate 187 students who were remaining in the same buildings and districts. These students were then distributed in 62 6th-grade classes. Of these 62 classes, 10 classes were being taught by teachers who were formerly 5th-grade teachers in the Year 1 study. That is, 10 5th-grade teachers at Year 1 became 6th-grade teachers at Year 2 and they had 29 students from the Year 1 sample. Those teachers and their classes were accepted in the Year 2 sample. From the remaining 52 classes with new 6th-grade teachers, we selected those classes with four or more students from the Year 1 sample or with two or more mainstreamed students from the Year 1 sample. Twenty-one teachers and their classes were selected as a result. Overall, we were able to obtain 108 (48.6%) students who were in the original Year 1 sample. In addition, we sampled 7 5th-grade teachers from Year 1 who at Year 2 had a new group of 5th-grade students. The Year 2 sample then consisted of 62 mainstreamed LD students and 166 regular students from 38 5th and 6th-grade classes (7 5th-grade classes and 31 6th-grade classes). Table 1 displays the distribution of mainstreamed and regular students in both years of the study.

TABLE 1

Distribution of Mainstreamed and Regular Students in Year 1 and Year 2 of the Study

	Grade	Mainstreamed	Regular	Total
Year 1	(5th grade)	79	143	222
Year 2	(5th & 6th grades)	62	166	228

Description of Student Sample

Student sample will be described in terms of Year 1 and Year 2 students.

Year 1 Student Sample

The Year 1 student sample consisted of 220 5th-graders* from six suburban Bay Area school districts. Of this sample of students, 79 students (36%) were mainstreamed LD students and 141 students (64%) were regular students.

The age range of the students were 10.2 years to 12.9 years. The mean age of mainstreamed LD students was about one half year higher than of the regular students (11.4 years and 11.0 years respectively). In addition, approximately two-thirds of the mainstreamed sample were boys (67.1%) while half of the regular sample were boys (49.6%). Thus, there were about 25% more boys in the mainstreamed sample than in the regular sample.

With respect to ethnicity, 66% of the total Year 1 student sample were white and the remaining 34% were ethnic minorities. Black students

*The original student sample was 222. Two regular students transferred out the schools during the study.

constituted the most prevalent group in the ethnic minority sample (about 22%). Table 2 displays the ethnicity distribution for mainstreamed and regular students in the Year 1 sample.

As Table 2 shows, the ethnic distributions for mainstreamed and regular students were strikingly similar. There is no more concentration of ethnic minorities in the mainstreamed student sample than in the regular student sample.

TABLE 2

Distribution of Mainstreamed and Regular Students by Ethnicity - Year 1 (N=220)

	Mainstreamed		Regular	
	Frequency	Percent	Frequency	Percent
White	54	68.4	91	64.6
Hispanic	7	8.9	9	6.5
Black	18	22.7	31	22.3
Asian	0	0	7	5.2
Native American	0	0	2	1.4
Total	79	100.0	141	100.0

In order to examine student math achievement, a grade level range on the total math score attained on school-administered standardized achievement tests (in most cases, the California Test of Basic Skills) was established. Students were grouped according to whether they were at, below, or above grade level at the time the achievement test were administered. If the math grade equivalent (GE) score was within the nine months of the school year in which the test was taken, the student was "at grade level." If the score was below the range, the student was assigned to the "below grade

level" category. If the score was above the range, the student was "above grade level." Based on this rather crude scale, math achievement was determined for mainstreamed and regular students. As indicated in Table 3, 53.2% of the mainstreamed students were below grade level compared to 9.9% of the regular students. Over 63% of the regular students were above grade level; only 15.2% of the mainstreamed students were in the above grade level category.

TABLE 3

Distribution of Mainstreamed and Regular Students by Math Grade Level Range - Year 1 (N=220)

Grade Level Range	Mainstreamed		Regular	
	Frequency	Percent	Frequency	Percent
Below Grade Level	42	53.2	14	9.9
At Grade Level	20	25.3	30	21.3
Above Grade Level	12	15.2	89	63.1
Missing Data	5	6.3	8	5.7
Total	79	100.0	141	100.0

The data point out that regular students, as expected, tend to be higher achievers in math than mainstreamed students. However, mainstreamed students also show substantial variability in math achievement.

Year 2 Student Sample

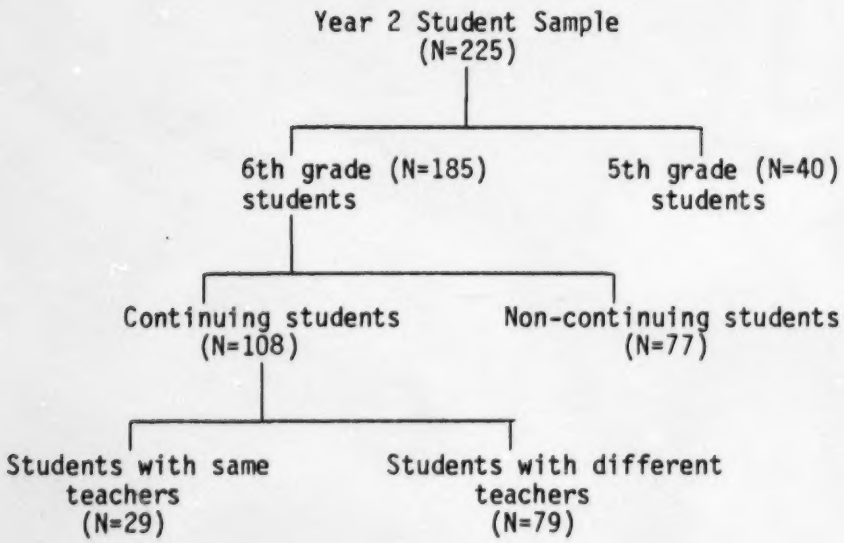
The Year 2 student sample consisted of 225 students.* Of this sample,

*The original student sample was 228. Three students were dropped from the study due to transfer and excessive absences during the study.

185 students were 6th graders and 40 students were 5th graders. Of the 185 students who were 6th graders; 108 students were in the original Year 1 sample (continuing students). The remaining 77 students were new 6th grade students. (non-continuing students). Of these 108 continuing 6th grade students, 29 students were in classes taught by the same teachers who were previously their 5th grade teachers (students with same teachers). In other words, some of the 5th grade teachers in Year 1 (N=10) became 6th grade teacher in Year 2. All of the 5th grade students in the Year 2 sample were new students to the study. However, they all had teachers who were in the Year 1 study. Thus the Year 2 sample consists of a number of sub-groups as follows (Figure 2).

FIGURE 2

Year 2 Student Sample Group



From the total Year 2 sample, 62 students (27.8%) were mainstreamed LD students and 163 (72.2%) were regular students. Approximately, three-fourth (73.8% of the mainstreamed student sample were boys while about half (51.5%)

of the regular student sample were boys. With respect to ethnicity, Table 4 displays ethnic distribution of students between mainstreamed and regular students.

TABLE 4

Ethnic Distribution of Mainstreamed and Regular Students - Year 2 (N=223)

	Mainstreamed		Regular	
	Frequency	Percent	Frequency	Percent
White	47	75.8	107	66.5
Hispanic	3	4.8	9	5.6
Black	12	19.4	33	20.5
Asian	0	0	11	6.8
Native American	0	0	1	0.6
Total	62	100%	161	100%

The distribution of math achievement for mainstreamed and regular students shown in Table 5.

TABLE 5

Distribution of Mainstreamed and Regular Students by Math Grade Level Range - Year 2 (N=225)

Grade Level Range	Mainstreamed		Regular	
	Frequency	Percent	Frequency	Percent
Below Grade Level	42	67.8	21	12.9
At Grade Level	6	9.6	37	22.7
Above Grade Level	7	11.3	91	55.8
Missing Data	7	11.3	14	8.6
Total	62	100%	163	100%

Thus 67.8% of mainstreamed students were below grade level while only 12.9% of regular students were below grade level. Conversely 11.3% of mainstreamed students were above grade level and 55.8% of regular students were above grade level.

Description of Teacher Sample

Thirty-seven 5th grade teachers constitute the Year 1 sample. Teachers were highly experienced (mean years of teaching experience = 14.6). Few (24%) had formal training in Special Education within the past five years, although the majority received in-service (73%) in this area. The average class size was 28.9 students and the number of handicapped students in the class ranged from 1 to 8 with a mean of 3.16.

Thirty-eight teachers constituted the Year 2 sample. Thirty-one of these teachers were 6th grade teachers; the remaining seven were 5th grade teachers. Teachers were highly experienced (mean years of teaching experience = 14.9). Within the past five years, 15.8% had course work and 34.2% had in-service in Special Education. The average class size was 29.5 students and the number of handicapped students in the class ranged from 0 to 8 with a mean of 2.46.

Teachers were asked to assess the impact of their training on their ability to work with handicapped students. On a six-point Likert scale, ranging from no impact (1) to a great deal of impact (6), 73% of Year 1 teachers and 51% of Year 2 teachers indicated small, negligible or no impact while 27% of Year 1 teachers and 49% of Year 2 teachers indicated fair, substantial and great deal of impact.

Teachers were also asked to indicate the degree in which IEPs helped them in: planning sequential curriculum activities for handicapped students,

focusing on individual needs, coordinating student's programs, and measuring and monitoring student progress. A six-point Likert scale was used ranging from no effect (1) to a great deal of effect (6). Table 6 shows the mean ratings by teachers in Year 1 and Year 2.

TABLE 6

Teacher Mean Ratings of Helpfulness of IEP
(N=37,38)

Input of IEP on	Year 1	Year 2
Planning Curriculum	2.9	2.9
Individualizing instruction	3.9	3.6
Coordinating services	3.4	3.4
Monitoring and measuring progress	3.6	3.1

(1 = no impact; 2 = negligible impact; 3 = small amount; 4 = fair amount, 5 = sustantial amount, 6 = a great deal of impact)

As Table 6 indicates, practically all Year 1 and Year 2 teacher mean ratings fell within the scale points of small to fair amount of impact. That is, IEPs were thought to be of small to fair amount of help for teachers in these areas of instruction.

Thus, as a whole, teachers in both years of study were experienced teachers with 14 years of teaching experience, who on the average had classes of approximately 29 students with 2 to 3 mainstreamed students in each class. Few had formal training in Special Education with the past five years and about half of the teachers had in-service training. Fifty to seventy percent of the teachers indicated that their training in Special Education had small impact on their teaching and all of the teachers felt that the IEPs had been a small to fair amount of help in

their teaching.

Data Collection Methods

Data for both years of the study were collected using three methods: examination of student files, teacher questionnaires, and classroom observations.

Student Files

Student files wre examined to obtain student background information; i.e., age (birth date), sex, ethnicity, status (regular vs. mainstreamed LD students), and math achievement (See Appendix A). Since students came from different districts which used different standardized tests and given in different years, student math achievement data required adjustments. With the sample of students, four different standardized achievement tests were used: CTBS, SRA, Metropolitan, and CAT, with CTBS being the most prevalently used test. Students were tested on these achievement tests as far back as three years ago, and as recently as a few months prior to the observation date. To obtain somewhat comparable achievement data, the following procedure was adopted. Student total math score expressed in grade-equivalent scores were obtained. These scores were grouped according to whether they were at, below, or above grade levels at the time the achievement test was administered. If the grade-equivalent score was within the nine months of the school year in which the test was given, the student was designated "at grade level." If the score was below the range, the student was designated "below grade level." And if the score was above the range, the student was designated "above grade level." Those determination were made based on students' math score from a given achievement test.

Teacher Questionnaire

Teachers in the study were administered a questionnaire prior to the classroom observations. The questionnaire (see Appendix B) was designated to obtain teacher background information (e.g., years of teaching experience, amount of training in Special Education) perception on usefulness of IEPs, as well as information about the class, e.g., class size, and number of handicapped students in the class.

Classroom Observation

Classroom observations constituted the primary and the most labor-intensive data collections method. For each of the two years of the study, trained observers observed classes during the math period once a week for five consecutive weeks. Thus, for each class there was a total of five observation occasions. During each observation, the observer focused his/her attention on six identified students and their interactions with the teacher, the aide (if available), and other students. The observer was trained to observe one student for one moment and record his/her behavior at the moment on the classroom observation form. (See Appendix C) The form called for records of: time of observation, setting of instruction (self-paced/other paced), content of instruction (math instruction, other instruction, non-instructional activities) engagement (engaged/non-engaged), level of success of task, (high, medium, low), teacher moves (explanation, academic feedback, academic questions, structuring/directing, positive feedback, negative feedback), source of instruction (teacher, other adult, student, curriculum) and focus of instruction (group/individual). After he/she had completed recording student behavior at that moment, the observer turned his/her attention to the next child, until all six identified students were observed and their behaviors recorded. This process took

approximately five minutes. Having completed one cycle of observations of six students, the observer returned to the first child in the cycle and repeated the process. Thus, within a math class of, say, 60 minutes, approximately 12 samples of moments would have been observed and recorded per child. Or, over a five-week period, approximately 60 samples of moments or data points on each child were obtained, and over the ten-week period (for both years of the study), approximately 120 samples of data points on each student were obtained. These data points were then aggregated by students for analysis purposes.

III. STUDY FINDINGS

Findings of the study are organized around the following three sets of questions/issue.

(1) What are the ALT differences between mainstreamed and regular students?

(2) How stable are ALT measures for mainstreamed and regular students?

(3) What are the student, teacher, and classroom variables which are related to ALT for mainstreamed and regular students?

Group Differences on Academic Learning Time

The first set of questions has to do with how mainstreamed students as a group differ from their regular counterparts. In this section, data are presented on ALT differences between mainstreamed and regular students in both years studied (220 5th-graders in study Year 1 and 185 6th-graders in study Year 2). In addition, a special analysis is presented for that subset of students who were observed in both years of the study.

ALT Differences - Year 1

For the Year 1 sample of 220 5th graders, Table 7 shows the mean percent of allocated time, engaged time, and time on each of three levels of success by student status (mainstreamed/regular).

TABLE 7

Mean Percent of Allocated Time, Engaged Time, and Time on Task at Each of Three Levels of Success for Mainstreamed and Regular Students in Year 1 (N=220)

ALT Variables	Mainstreamed (N=79)	Regular (N=141)	t
Allocated Time	59.0	66.6	2.70**
Engaged Time	71.6	79.9	2.85**
Time on High Success	15.7	36.7	5.16**
Time on Medium Success	74.8	59.6	3.01**
Time on Low Success	9.5	3.7	4.81**

**difference significant at $p < .01$

There were significant differences between the two groups in all five ALT variables. Compared to regular students, mainstreamed students had less percent on allocated time (59.0% vs. 66.6%) and engaged time (71.6% vs. 79.9%). The most pronounced differences, however, are with respect to percent time on task at different levels of success. Mainstreamed students had less time on high-success tasks (15.7% vs. 36.7%) and more time on medium- and low-success tasks (9.5% vs. 3.7%). Thus, when ALT is defined as the percent of time engaged on high-success tasks, mainstreamed students had less than half the ALT of their regular counterparts.

ALT Differences - Year 2

For the Year 2 sample of 185 6th-graders, ALT differences between groups are shown in Table 8.

TABLE 8

Mean Percent of Allocated Time, Engaged Time, and Time on Each of Three Levels of Success for Mainstreamed and Regular 6th-Grade Students in Year 2 (N=183)

ALT Variables	Mainstreamed (N=54)	Regular (N=129)	t
Allocated Time	70.7	70.8	.06
Engaged Time	71.7	75.2	1.46
Time on High Success	5.2	19.8	6.53**
Time on Medium Success	78.2	77.1	0.32
Time on Low Success	16.5	2.9	4.70**

**difference significant at $p < .01$

For Year 2 6th-grade students, ALT differences between groups were not significant for either allocated time or engaged time. Again, differences are most pronounced with respect to distribution of time on each of the three levels of success. Mainstreamed students had less time on high-success tasks (5.2% vs. 19.8%) and more time on low-success tasks (16.5% vs. 2.9%). Thus, mainstreamed students had approximately one-fourth the ALT of regular students.

These data from Year 1 and Year 2 indicate that differences in percent of allocated time and engaged time favored regular students in both years; however these differences were significant only in the Year 1 data. With respect to the distribution of time on different levels of success, the data were consistent across years: while both groups spent the major portion of their time on medium-success tasks, mainstreamed students tended to have significantly less time on high-success tasks and more time on low-success tasks.

ALT Differences for Students in Both Years

To determine whether differences in ALT between groups are related to different student experiences and behaviors from Year 1 to Year 2, or if

they result from differential sample selection between years, comparisons were made on ALT variables between Year 1 and Year 2 on the subsample of 108 continuing students: those for whom complete data were available in each of the two years. The results are presented in Table 9.

TABLE 9

Mean Percent of Allocated Time, Engaged Time, and Time on Each of Three Level of Success for Continuing Mainstreamed and Regular Students (N=108)

ALT Variables	Year 1 Mainstreamed (N=38)	Year 1 Regular (N=70)	t	Year 2 Mainstreamed (N=38)	Year 2 Regular (N=70)	t
Allocated Time	64.3	63.3	.293	72.3	69.4	.937
Engaged Time	72.1	81.3	3.06**	71.4	73.7	.785
Time on High Success	14.9	34.7	4.44**	5.8	22.4	5.32**
Time on Medium Success	76.1	60.4	3.52**	80.7	73.1	1.97
Time on Low Success	8.2	5.0	1.57	13.4	4.5	3.01**

**difference significant at $p < .01$

Comparison of the data in Table 9 with those in Tables 7 and 8 indicates that the subsample of 108 continuing students is very similar in its ALT characteristics to the larger samples in both years. That is, continuing mainstreamed and regular students were not significantly different from the entire samples of mainstreamed and regular students observed in either Year 1 or Year 2.

Within the subset of continuing students, differences between mainstreamed and regular students were most pronounced in the ALT variables of engaged time and time on different levels of success. From Year 1 to

Year 2, engaged time for regular students dropped from 81.3% to 73.7%, whereas for mainstreamed students it changed only slightly, from 72.1% to 71.4%. However, there was significantly less high-success time and more low-success time for mainstreamed students in both years (14.9% vs. 34.7% in Year 1; 5.8% vs. 22.4% in Year 2). In other words, the two groups, mainstreamed and regular, differed on ALT by a factor of about two in Year 1 and a factor of about four in Year 2. These patterns are in line with what was found earlier for the total groups of students in Year 1 and Year 2.

Since the same patterns of year-to-year differences appear in the subset of continuing students as well as in the total samples for the two study years, it is reasonable to conclude they were not simply artifacts of sample selection, but reflect real changes in the students observed over the two-year period.

Stability and Change of Academic Learning Time

The previous section identified some salient differences between mainstreamed and regular students in relation to ALT variables, both in Year 1 and in Year 2. It also dealt with changes in group means across the two years of the study. In this section the issues examined relate more to shifts in the relative rankings of individual students rather than group means.

These issues are of interest both in the context of this particular study and more generally with regard to the nature of ALT. With regard to this particular study, the issues have to do with student-by-student changes in ALT variables in relation to student status, as mainstreamed or regular. The more general issue is the relative stability/reliability

of ALT indices in general.

The question of stability/change can be approached as either an issue of variation from one week to the next within a given year (variation across occasion), or as an issue of variation from one year to the next (variation across years). Both of these contexts are analyzed below.

Variation across Occasions

Within each year, each of the ALT variables was observed over five occasions one week apart. These five observations were intercorrelated, resulting in a matrix of 10 distinct correlations for each ALT variable. Table 10 presents the matrix of Pearson correlation coefficients for percent engagement across the five occasions observed in Year 2. Table 11 displays the range of correlation coefficients across the five occasions in Year 2, and the median within the ranges for each of five ALT variables.

TABLE 10

Correlation Coefficients for Percent Engagement at Each of Five Occasions Within Year 2

	Occasions				
Occasions	1	2	3	4	5
1		.30	.22	.32	.35
2			.41	.49	.42
3				.40	.34
4					.39
5					

TABLE 11

Range of Median Correlation Coefficient
for ALT Variables by Occasion with Year 2
(N = 202 - 214)

ALT Variables	Range	Median
Allocated Time	.15 - .35	.28
Engaged Time	.22 - .49	.38
Time on High Success	.03 - .48	.20
Time on Medium Success	-.05 - .38	.17
Time on Low Success	-.03 - .40	.24

The data in Table 10 and 11 reflect considerable variation from one occasion to another. While the correlations for percent engagement were in the acceptable range for observational data, those from the three levels of task success were quite low: note that the lower ranges for the medium- and low-success levels were essentially zero.

This lack of consistency from one occasion to another made it inappropriate to analyze the ALT variable on an occasion-by-occasion basis. Consequently, the general rule that has been adopted for discussing ALT data in most of this report is to use the aggregate index generated by averaging the observations for all five occasions in a given year. The assumption is that these aggregated indices are more stable than the occasion-by-occasion data.

Variation across Years

The issue of variation across years can be examined only with reference to the 108 continuing students -- those for whom complete data are available in both years of the study. Table 12 presents the correlation coefficients for ALT variables summed across occasions within each of the two study

years, with a breakout by mainstreamed/regular status.

TABLE 12

Pearson Correlation Coefficients for ALT Variables Aggregated across Occasions Within Study Year and Correlated across Years 1 and 2, for All Continuing Students, with a Breakout by Mainstreamed and Regular Status (N = 108)

ALT Variables	Total (N=108)	Mainstreamed (N=38)	Regular (N=70)
Allocated Time	0.094	-0.118	0.210
Engaged Time	0.246**	0.299	0.099
Time on High Success	0.266**	-0.077	0.199
Time on Medium Success	0.074	-0.134	0.060
Time on Low Success	0.333**	-0.084	0.262*

*$p < .05$
**$p < .01$

The r values vary from low to just below the zero point. For mainstreamed students, the only respectable correlation was for engaged time ($r = .30$) and for regular students the highest correclation was for time on low success ($r = .26$). For the two groups combined, the correlations were somewhat higher, but still quite low. The highest correlation is for time on low success ($r = .33$). In other words, the value of an ALT index associated with a given student in Year 1 is a poor predictor of the corresponding ALT index associated with that student at Year 1.

At first glance these outcomes may seem a bit unexpected and even disappointing. After all, if ALT is a valid and useful predictor of academic achievement, one should expect it to be consistent from occasion to occasion and from year to year.

However, with respect to the year-to-year variation it must be remembered that ALT variables are not student-specific, but student-context

specific. As the student moves from one grade to another, and experiences a complete change in terms of teacher, classmates, subject matter, classroom, often even school, it is not expected that indices of this student-context such as ALT variables will remain unaffected.

With respect to the occasion-to-occasion variation, there is somewhat more of a problem. True, the events and situations are different from one observation to another, but the overall context -- teacher, classroom, subject matter, classmates, etc. -- are essentially the same. Moreover, the whole concept of ALT is based on a notion of predicting academic achievement, and any validity for prediction presupposes that the variable in question is reliable and therefore stable. A gross lack of stability limits reliability and therefore validity. But even here, there is the possibility that aggregating over a number of occasions increases the stability to a sufficient degree to make ALT indices reliable and valid predictors. (Our strategy of aggregating across occasions within study year is based on that assumption.) Nevertheless, it will be an important task for future research to determine to what extent such aggregation does lend to stable, reliable, and valid ALT variables.

Factors Related to Academic Learning Time

Several types of variables were examined in terms of their relationship to ALT variable. These variables include: student background variables, teacher background variables, instructional variables, and classroom variables. The relationship of each set of variables to ALT variables is examined below.

Student Background Variables: Age, Sex, Ethnicity, and Academic Achievement

In both years, mainstreamed and regular students varied on a number of variables, such as age, sex, and achievement. Mainstreamed students were about half a year older than regular students (Year 1 sample, mean age = 11.4 vs. 11.0; Year 2 sample, mean age = 12.2 and 11.7 respectively). There were about 20% more boys in the mainstreamed student sample than in the regular student sample (Year 1 sample, percent of boys = 67.1% and 49.6%; Year 2 sample, percent of boys = 73.8%, 51.5% respectively). With respect to achievement, more than half of the mainstreamed students were below grade level, about 10% of the regular students were below grade level (Year 1 sample, percents below grade level = 53.2% and 9.9%; Year 2 sample percent below grade level = 76.5% and 14.1% respectively). In terms of ethnicity, differences between mainstreamed and regular students were not evident in this sample of students. In the Year 1 sample, 31.5% of the mainstreamed students and 35.4% of the regular students were ethnic minorities. In the Year 2 sample, 24.2% of the mainstreamed students and 33.5% of the regular students were ethnic minorities. In both years, there was a slightly higher percentage of ethnic minority students in the regular sample. In addition, in both years the distribution of ethnic minorities in terms of Black, Hispanic, Asian, and other groups was comparable within mainstreamed and regular students, with the Black student sample the most prevalent (approximately 20%).

Since differences between groups existed on the variables of age, sex, and achievement, analysis was done to determine whether group differences in ALT might be in part due to difference in these background variables.

Age did not turn out to be a major factor. Of the ten correlations of age with ALT variables for both years of the data, age was significantly

correlated with percent of time on low-success tasks ($r = .31$, $p < .01$) for the Year 1 data only. Age was not significantly correlated with other ALT variables in Year 1 nor with any ALT variables in Year 2.

The relationship of sex to ALT components was inconsistent from Year 1 to Year 2. For Year 1, sex was significantly related to percent of engaged time, ($r = .17$, $p < .01$) percent of high-success tasks, ($r = .19$, $p < .01$) and percent of medium-success tasks, ($r = -.19$, $p < .01$). Specifically, girls tended to have more engaged time and high-success time, and less medium-success time than boys. For Year 2, sex was not significantly related to any of the ALT components.

Student achievement appeared to have a moderate relationship to ALT. For Year 1 students, achievement was significantly correlated with percent engaged time ($r = .16$, $p < .05$); percent time on high-success tasks ($r = .37$, $p < .01$); percent time on medium-success tasks ($r = -.30$, $p < .01$), and percent time on low-success tasks ($r = -.24$, $p < .01$). That is, high math achievers tended to have more engaged time, more high-success time, and less medium- and low-success time. For Year 2, student achievement was significantly correlated with percent time on high-success tasks ($r = .34$, $p < .01$) and percent on low-success tasks ($r = -.23$, $p < .01$), and not significant with other ALT components. That is, high achievers showed more time on high-success tasks and less time on low-success tasks.

For the group as a whole, age tended not to be generally correlated with ALT variables. Sex showed some relationship with ALT although the relationships were weak ($\underline{r}$ values less than .20) and inconsistant between years. Achievement was moderately related to ALT variables, for both years, particularly with time on levels of success. These correlations tended to be between .25 to .40. The strongest correlations were between

achievement and percent time in high success tasks (r = .37 and .34). For mainstreamed and regular students considered separately, the relationships of age, sex, and achievement showed disparate patterns.

First, considering mainstreamed students only. Sex was significantly related to time on high- and medium-success tasks, in the Year 1 data: mainstreamed girls tended to have more time on high-success tasks ($r = .28$, $p < .05$) and less time on medium-success tasks ($r = -.29$, $p < .05$) than mainstreamed boys. No sex differences were observed in Year 2 data. Age was significantly correlated with time on high-success and medium-success tasks in Year 1 for mainstreamed students: older mainstreamed students had less time on high-success tasks ($r = -.36$, $p < .01$), and more time on medium-success tasks ($r = .27$, $p < .05$) than younger main streamed students. No differences in age were observed for Year 2 data. For mainstreamed students, there was no significant correlations between achievement and ALT components for both years.

For regular students, no age or sex differences were observed for either Year 1 or Year 2 data, but significant correlations were found between achievement and time on high- and medium-success tasks. For both years, high regular achievers had more time on high-success tasks (Year 1, $r = .31$, $p < .01$; Year 2, $r = .26$, $p < .01$), and less time on medium-success tasks (Year 1, $r = -.31$, $p < .01$; Year 2, $r = -.18$, $p < .05$).

These relationships of ALT variables with student background variables indicated that the relationships of age and sex with ALT variables were found in the mainstreamed sample and only in the first year data. In these cases, younger mainstreamed students and mainstreamed girls had more ALT than older students in general and mainstreamed boys. No age or sex differences were evident in the regular student sample. Achievement, on the

the other hand, showed moderately strong correlations with ALT ($r = .31$ and .26) for regular students only. No significant correlations were found between ALT variables and achievement for mainstreamed students. Thus, there is no consistently strong indication to suggest that age, sex and achievement differences between mainstreamed and regular students account for ALT difference between the two groups.

Teacher Background Variables

Teacher background variables included: years of teaching experience, coursework in Special Education within the last five years, perception of impact of training, and perception of usefulness of IEP on planning curriculum, focusing on individual student needs, coordinating student programs, and monitoring student success. The relationships of teacher background variables to ALT variables was negligible. None of these correlations were significant, except the one between allocated math time and years of teaching experience, which was significant as well as negative for both Year 1 ($r = -.20$, $p < .01$) and Year 2 ($r = -.26$, $p < .01$). That is, students of more experienced teacher tended to show less allocated math time within a given math period.

Classroom Variables

The classroom variables of class size and number of handicapped students in the classs were correlated with ALT variables for both Year 1 and Year 2. The results are presented in Table 13.

TABLE 13

Correlations of ALT Variables with
Classroom Variables for Both Years

ALT Variables	Class Size		No. of Handicapped Students	
	Year 1	Year 2	Year 1	Year 2
Allocated Time	-.15	-.27**	.13	-.08
Engaged Time	.01	.08	-.30**	.04
Time on High Success	-.01	.15	.04	-.02
Time on Medium Success	.00	-.13	-.02	-.21**
Time on Low Success	-.02	-.01	-.02	.32**

**$p < .01$

Class size was negatively correlated with allocated time (r = -.15 and -.27). That is, as class size increased, student allocated time in math instruction decreased. Class size was not significantly correlated with other ALT variables. The number of handicapped students in the class was significantly and negatively correlated with engagement at Year 1 (r = -.30); it was significantly and negatively correlated with medium-success tasks and correlated with low-success tasks at Year 2 (r = .32). That is, as the number of handicapped students in the class increased, the percent engaged time decreased, and time on low-success tasks increased. However, these results were not consistent across years. Class size and number of handicapped students in the class were not significantly correlated with percent time on high-success tasks.

Instructional Variables

Instructional variables include: teacher classroom behavior (explanation, academic feedback, academic questions, structuring and directing instruction, positive and negative feedback), source of instruction (from

teacher, other adults, curriculum and other students), and focus of instruction (on group or individual students). Table 14 displays the r table for the data for both years.

For Year 1 data, allocated time was not significantly correlated with any instructional variables. Percent engaged time was significantly correlated with four of the six teacher classroom instructional variables: teacher explanation ($r = .37$, $p < .01$), teacher academic feedback ($r = .36$, $p < .01$), structuring/directing instruction ($r = .22$, $p < .01$) and teacher negative feedback ($r = -.41$, $p < .01$). Engaged time was also significantly correlated with teacher as the source of instruction ($r = .42$, $p < .01$) and with the curriculum ($r = .30$, $p < .01$). Finally, engaged time was significantly correlated with teacher focus of instruction on groups ($r = .47$, $p < .01$) and negatively correlated with student as source of instruction ($r = -.19$, $p < .01$). The ALT variables on levels of success in general were not significantly correlated with other instructional variables.

For Year 2 data, the general pattern of correlations appears similar to that from Year 1. Allocated time was not significantly correlated with instructional variables. Engagement was again significantly correlated with many of the teacher instructional variables: teacher explanation ($r = .31$, $p < .01$), academic feedback ($r = .38$, $p < .01$), academic questioning ($r = .40$, $p < .01$), and structuring and directing instruction ($r = .33$, $p < .01$). Engaged time was also significantly correlated with teacher as source of instruction ($r = .48$, $p < .01$), student as source of instruction ($r = -.19$, $p < .01$), and group as focus of instruction ($r = .52$, $p < .01$).

These data suggest that the teacher's instructional behavior in class

TABLE 14

Correlations of Instructional Variables
and ALT Variables for Both Years

Instructional Variables	Allocated Time		Engaged Time		Time on High Success		Time on Medium Success		Time on Low Success	
Teacher Behavior	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
Explanation	.12	.05	.37**	.31**	-.05	-.08	.05	.11	-.00	-.06
Academic Feedback	.13	.02	.36**	.38**	.06	-.14	-.12	.11	.14	.02
Academic Question	.02	.01	.11	.40**	.04	-.09	-.02	.18	-.04	-.14
Structuring/ Directing	.03	.02	.22**	.33**	-.03	.03	.07	-.01	-.07	-.01
Positive Feedback	.06	.05	.07	.07	.15*	.01	-.11	.05	-.10	-.07
Negative Feedback	.12	.04	-.41**	-.18	-.02	.00	.19	-.07	.03	.09
Source of Instruction										
Teacher	-.07	.06	.42**	.48**	-.10	-.14	.05	.14	.11	-.03
Other Adult	-.07	0.26**	-.00	.05	-.05	.02	.09	-.08	-.08	.09
Curriculum	-.04	.03	.30**	-.07	.24**	-.01	-.21**	-.02	-.08	.04
Student	-.03	.01	-.19**	.29**	.00	-.01	.00	.10	.00	-.12
Focus of Instruction										
Group	-.05	.06	.47**	.52**	.08	-.06	-.03	.12	-.11	-.10
Individual	-.11	-.07	-.16*	-.17*	-.15*	-.18*	-.01	.05	.36**	.15

*$p < .05$
**$p < .01$

is strongly correlated with student engagement. Four of six teacher instructional behaviors in each year of the study showed correlations with engagement ranging from .22 to .41 with a median of .36. Furthermore, teacher as source of instruction (r = .42 and .48) and group as the focus of instruction (r = .47 and .52) showed strong correlations with engagement. It is clear that engagement was strongly correlated with what teachers do in class and with how they organize the source and focus of instruction.

To further explain the relationships of instructional variables with engagement, scores were aggregated by class. Table 15 displays the $\underline{r}$ value, between instructional variables and engagement for mainstreamed and regular students (by class) for both years of the study.

TABLE 15

Correlations of Student Engagement with Instructional Variables by Class, by Mainstreamed and Regular for Both Years

	Year 1		Year 2	
Instructional Variables	Mainstreamed	Regular	Mainstreamed	Regular
Teacher Instruction				
Explanation	.12	.46**	.34*	.48**
Academic Feedback	.38*	.48**	.46**	.38*
Academic Question	.26	.14	.46**	.32*
Structuring/Directing	.14	.40*	.18	.42**
Positive Feedback	.10	.14	.18	.07
Negative Feedback	-.23	-.35*	-.14	-.38*
Source of Instruction				
Teacher	.26	.63**	.44*	.62**
Other Adult	-.06	-.02	-.04	.08
Curriculum	.51**	.28	-.18	.02
Student	-.20	-.13	.35*	.22
Focus of Instruction				
Group	.49**	.61**	.57**	.56**
Individual	-.42**	-.21	-.19	-.03

* $\underline{p} < .05$
** $\underline{p} < .01$

Table 15 shows lower correlations between teacher instructional behavior and engagement for regular students than for mainstreamed students. Teacher as the source of instruction tended to show slightly stronger correlations with engagement for regular students. Curriculum as source of instruction and student as source of instruction showed mixed significant correlations with engagement of mainstreamed students. Group as the focus of instruction showed a similar pattern of significant correlations with engagement for both mainstreamed and regular students. However, when the focus of instruction is on individual students, engagement of mainstreamed and regular students decreases. That is, when the teacher is attending to an individual child, engagement for the remaining students decreases. This appeared more evident with mainstreamed students ($\underline{r}$ = -.42 in Year 1).

IV. SUMMARY OF FINDINGS AND STUDY IMPLICATIONS

This study is intended as a descriptive study on learning experiences of mainstreamed LD students. Its aim is simply to describe these learning experiences and how they differ from those of regular students, not to probe why they differ or to prescribe remedies in the areas of teaching or staff development. However, findings of this study do have implications for future research directions on the implementation of PL 94-142 at the classroom level. Implications for future research will be discussed so that additional in-class research can be done to draw causal links between experiences of mainstreamed students and the dynamics of the mainstreamed class.

With respect to the study's implications for practice, descriptions of experiences of LD students in mainstreamed classes need to be differentiated from judgments or values on what their experiences ought to be. While the investigators of this study have personal and professional judgments in this area, it is the teachers, teacher trainers and school administrators who review the findings of the study who need to determine for themselves what they can do to ensure that mainstreamed students have more quality learning experiences in the regular classes.

In short, we view the findings of this study as stimuli for researchers to investigate the causal relationship underlying learning experiences of mainstreamed LD students, and for practitioners to determine if and how practice can be improved. Findings will be summarized by each of the three major questions/issues posed in this study; implications for research and practice will be discussed issue by issue.

ALT Differences between Mainstreamed and Regular Students

- Within the academic area studied (math) of a regular class in which handicapped students were mainstreamed, students overall spent two-thirds of the time on academic activities; one-third of the time is spent on non-academic activities, such as breaks, transitions, classroom management and other interruptions.

- If an LD student was mainstreamed in a regular class he/she had about the same amount of time in an academic area which was allocated to instruction in that area as the regular student in the same class.

- If an LD student was mainstreamed in a regular class he/she spent somewhat less time engaged in academic tasks than a regular student in the same class.

- If an LD student was mainstreamed in a regular class he/she spent much less time engaged in academic tasks which offered high success than a regular in the same class (about one-third). Conversely this LD student spent much more time engaged in academic tasks which offered low success than a regular student in the same class (about three times more).

- For LD students in a mainstreamed class, achievement, as measured by standardized math achievement tests, was not related to amounts of time engaged on high and low-success tasks. However, for regular students, math achievement was positively related to time engaged on high-success tasks and negatively related to time engaged on low-success tasks.

- For LD students in a mainstreamed class who were either younger or female, there was some likelihood of spending a greater amount of time engaged on high success academic tasks. However, age and sex were not related to time engaged on high success tasks for regular students.

These findings can be stated in this way: Student opportunity to learn within an academic area was about two-thirds (67%) of the designated time per'od for that academic area, and the other one third (33%) was spent on non-academic activities. If this phenomenon should hold true for other subject areas, the total opportunity loss for student learning could be very substantial. While a certain amount of interruptions and behavior management activities are always necessary, it is possible that time spent

on these activities can be reduced to offer more learning experiences. To bring this about, there may be a need for teachers to attend more closely to the management of an important school resource time; i.e., management of time. Assessment of time allocations and the use of time can help teachers to analyze their situations, and this in turn allows them to learn to use time constraints more purposefully. Feeling more in control of their class may lessen the anxiety expressed by many regular classroom teachers who have mainstreamed handicapped students (DHEW 1979).

There were some differences between mainstreamed and regular students on engaged time. However, the differences on engaged time spent on percent of high-success tasks was much greater. On the average, mainstreamed students had one-third the amount of high-success time as regular students and three times more on time engaged in low-success tasks. While it is difficult to set some type of standard for amount of success experiences for mainstreamed students, it is our belief that these differences which appear to work to the disadvantage of mainstreamed students are unacceptable. Further research is needed to explain these differences in order to offer ways to improve practices. Task appropriateness, or the lack of it, may be one intervening variable which governs this difference. If mainstreamed students are not provided with learning tasks which are appropriate for their ability level, these students will continue to experience lack of success and be isolated in the regular class.

The finding that younger and female mainstreamed students tend to have more high-success time than older and male mainstreamed students was not paralleled within the regular student sample. The research issues which can be raised here are: 1) to confirm or negate a sex and age bias for mainstreamed students; and 2) to postulate and investigate reasons

for such bias if it does exist.

Factors Related to Stability of ALT Indices

- Overall, ALT measures were relatively unstable from one week's observation to the next, and from one study year's average to the next. Of the five ALT variables, percent engaged time was the most stable, in the low-acceptable range of observational data ($r = .30 - .40$).

- The most stable ALT measure for mainstreamed students was percent time on low-success tasks ($r = .30$).

These indications that ALT measures maybe unstable, and therefore possibly unreliable, should be explored. Constraints on resources and the fact that the thrust of this study was descriptive rather than theorectical, both limited the data analysis devoted to this question, and these findings should therefore be regarded as suggestion only. But additional in-class studies involving ALT data collection should focus on this question to determine to what extent the various ALT measures can be considered more stable, reliable, and valid predictors of student learning. However, this does not negate the practical usefulness of ALT as an information tool for teacher to examine the effects of his/her daily instruction and make modifications in ways in which time is allocated and used.

Factors Related to ALT

- If the size of a mainstreamed class was large, then students in that class spent more time on non-academic activities and less time on academic activities within a given academic instructional period.

- If a mainstreamed class had large numbers of handicapped students, students in that class had less engaged time and more time engaged on low-success tasks. However, the relationship of number of handicapped students and ALT variables were mixed and the finding should be treated as tentative.

- o If the teacher of a mainstreamed class had more direct instructional behavior (i.e., explanations, academic feedback, academic questioning and shouting/directing instruction) then students in his/her class had more time engaged on learning tasks. This relationship was stronger for regular students than for mainstreamed students. Furthermore, teacher instructional behaviors were not related to time on high-success tasks.

- o If the source of instruction in a mainstreamed class was the teacher (as opposed to other adults, curriculum materials, and other students) students in that class had more engaged time learning tasks. However, source of instruction was not related to student time on high-success tasks.

- o If the focus of instruction in a mainstreamed class was on groups of students (as opposed to individual students) students in that class had more engaged time learning tasks. However, focus of instruction was not related to student time on high-success tasks.

- o If a mainstreamed class was taught by a more experienced teacher, students in her class spend less time on academic tasks within any given instructional period. In addition, the amount of training in Special Education, and teacher perception of influence of training on classroom planning and instruction were not related to ALT variables.

- o Given a mainstreamed class, the teacher's perception of the usefulness of student IEPs were not related to ALT measures of his/her students.

The findings on class size suggests that as class size increases, more time was spent on classroom management activities and less time on academic activities. However, class size showed no relationship with student engagement or time on success tasks. The number of handicapped students in a class showed mixed and weak relationships to student ALT variables.

Research efforts need to be focused on the effects that both the number of handicapped students and the variety of handicapping conditions represented in these students have on student learning experiences at large, particularly on those regular students in the mainstreamed class. It is a very real issue for administrators to make decisions about the

optimal number and the variety and severity of handicapping conditions a regular class situation can optimally accommodate. Research has yet to be helpful in making these administrative decisions.

There is strong evidence to show that teachers do make a difference in student engagement on learning tasks. When the teacher was directing instructional behavior; when the teacher is the source of instruction and when group is the focus of instruction, student engagement increases. On the other hand, direct instructional behaviors do not affect student success experiences on tasks. Student success on tasks was more a function of achievement (for regular students) than what teachers did in class. Investigations on the appropriateness of instructional behavior, the quality of instruction, and the match between task demands and student ability should shed light on these descriptive findings.

Mainstreamed students in this study all had IEPs with varying degrees of quality; however, there is an apparent discontinuity between the development of IEP and the implementation of plans and activities specified in the IEP. Teachers generally indicated that IEPs had small amounts of impact on instructional planning. Furthermore, their perceptions of the usefulness of IEPs tended not to be related to quantities of student learning experiences as measured by ALT. As has been shown in other studies (Stearns, 1980; Blaschke, 1979) The issue of IEP implementation, and its effects on mainstreamed classes and their teachers continues to be a key factor in the full implementation of the spirit of PL 94-142.

Epilogue

According to figures provided by the Bureau of Education for the Handicapped in its annual report to Congress on progress towards implementation

of PL 94-142, nearly 70% of handicapped students between ages 6 and 17 are being educated in varying degrees, in regular classes. Furthermore, other than speech impaired students, LD students represent the most prevalent group of handicapped students who are being served in regular classes. Given such prevalent use of regular classes placement involving large numbers of handicapped students, research on implementation of PL 94-142 at the regular classroom level is a critically needed area.

This study attempts to describe the academic learning experiences of mainstreamed LD students. Caution should be exercised to take descriptive findings from this study in toto when considering implications for teaching or teacher preparation. Although there is a strong implication from this and other ALT studies that student allocated time, engaged time and time on successful tasks can and should be increased, this implication must be viewed in the context of the total educational experiences of the mainstreamed child. Academics, important as they are, are not the only educational goals for successful mainstreaming. Investigations on social integration, self-concept, and student attitudes for mainstreamed students must complement studies on the academics.

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APPENDIX A

Student File Information Form

Date _____

STUDENT FILE INFORMATION

1. Name: _____ |___|

2. School: _____ |___|

3. Grade: _____ |___|

4. Classroom Teacher: _____ |___|

5. Age: _____ years _____ months |___|

6. Sex: _____ male _____ female |___|

7. Ethnicity: _____ |___|

8. Most recent achievement score:

   Test Name: _____ |___|

   Year Administered: _____ |___|

   Grade-Level Equivalent Score for "Total Math": _____ |___|

9. Educational Designation/Handicap: _____ |___|

   _____

10. Previous placement, if other than regular class:

    _____ resource room _____ special class _____ other |___|

APPENDIX B

Teacher Questionnaire

TEACHER QUESTIONNAIRE

1. Name _____

2. Social Security No. _____

3. School _____

4. District _____

5. Number of students in your class _____

6. How many minutes per day do you allocate to math instruction? _____

7. Number of years teaching experience _____

8. Check if you have had either of the following in the last five years:

   Coursework in Special Education ☐ no ☐ yes

   Inservice training in Special Education ☐ no ☐ yes

9. What impact has your previous training had on your ability to work with handicapped students currently in your classroom?

☐	☐	☐	☐	☐	☐
no impact at all	negligible amount	small amount	fair amount	substantial amount	a great deal of impact

10. Which type of assistance would be <u>most</u> helpful to you to work more effectively with handicapped students?

    ☐ additional training
    ☐ instructional materials
    ☐ classroom management techniques
    ☐ help from resource teacher
    ☐ release or planning time
    ☐ classroom aides
    ☐ other; please specify: _____

11. How many handicapped students do you have in your class? _____

12. What types of handicapping conditions are present in your class? Check all that apply.

- ☐ learning disability
- ☐ speech and language difficulty
- ☐ mental retardation
- ☐ behavioral/emotional disorder
- ☐ hearing impairment
- ☐ visual impairment
- ☐ orthopedic handicap

13. Other than yourself, what adults are generally present during your math class?

- ☐ other teacher
- ☐ resource teacher
- ☐ paid aide
- ☐ parent/volunteer
- ☐ other; please specify: _____

14. If you have an aide in your math class, what is his/her assignment? Check the one most characteristic of your class.

- ☐ no aide
- ☐ non-teaching duties, e.g., correcting papers
- ☐ teach regular students
- ☐ teach handicapped or slow students
- ☐ teach both handicapped and regular students

15. What has been the extent of your involvement in developing the Individual Educational Plans (I.E.P.s) for students in your class?

- ☐ have had no involvement; have not read plan(s)
- ☐ have had no involvement in development but have read plan(s)
- ☐ had awareness of plan(s) during development - e.g., attended meetings were plan/placement decisions were discussed
- ☐ had some input into plan(s) - e.g., wrote a section of plan
- ☐ had primary responsibility for formulating plan(s)

16. What has been the specific nature of your involvement with I.E.P's of students currently in your class? Check all that apply.

- ☐ made referrals for planning/placement
- ☐ have responsibility for carrying our parts of plan(s) in my class
- ☐ wrote anecdotal records for file
- ☐ met with resource specialist regarding student progress
- ☐ reviewed and presented student achievement information
- ☐ attended I.E.P. review meeting(s)

17. Has the I.E.P. helped you plan sequentially developed curriculum in working with handicapped students in your class?

no impact at all	negligible amount	small amount	fair amount	substantial amount	a great deal of impact

18. Has the I.E.P. helped you focus on the handicapped student's individual needs?

no impact at all	negligible amount	small amount	fair amount	substantial amount	a great deal of impact

19. Has the I.E.P. helped you coordinate the student's total program by specifying times and nature of services to be performed?

no impact at all	negligible amount	small amount	fair amount	substantial amount	a great deal of impact

20. Has the I.E.P. helped you systematically measure student progress?

no impact at all	negligible amount	small amount	fair amount	substantial amount	a great deal of impact

APPENDIX C

Classroom Observation Form

TEACHER GRADE SCHOOL DISTRICT OBSERVER OCCASION DATE PAGE NO.

Adult Role	No.	Total Time	Time By Activity			Time By Grouping			
			MI	OI	BI	IS	SG	LG	WG
Regular Teacher									
Resource Teacher									
Paid Aide									
Parent/Volunteer									
Other:									

student

Time	Set	Content		Success Rate & Learner Move		Instructional Interaction Moves / Source / Focus			
	S O	T M D A	MA OI	H M L	EW ED EC NI ND	EI AF AQ SD PF NF	T O S C	TS SG LG WG
1								
2								
3								
4								
5								
6								
7								
8								
9								
0								

student

Set	Content		Success Rate & Learner Move		Instructional Interaction Moves / Source / Focus		
S O	T M D A	MA OI	H M L	EW ED EC NI ND	EI AF AQ SD PF NF	T O S C	TS SG LG WG
1							
2							
3							
4							
5							
6							
7							
8							
9							
0							

student

Set	Content		Success Rate & Learner Move		Instructional Interaction Moves / Source / Focus		
S O	T M D A	MA OI	H M L	EW ED EC NI ND	EI AF AQ SD PF NF	T O S C	TS SG LG WG
1							
2							
3							
4							
5							
6							
7							
8							
9							
0							

student

Set	Content		Success Rate & Learner Move		Instructional Interaction Moves / Source / Focus		
S O	T M D A	MA OI	H M L	EW ED EC NI ND	EI AF AQ SD PF NF	T O S C	TS SG LG WG
1							
2							
3							
4							
5							
6							
7							
8							
9							
0							

student

Set	Content		Success Rate & Learner Move		Instructional Interaction Moves / Source / Focus		
S O	T M D A	MA OI	H M L	EW ED EC NI ND	EI AF AQ SD PF NF	T O S C	TS SG LG WG
1							
2							
3							
4							
5							
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7							
8							
9							
0							